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**Neck Pain** This double-blind, placebo-controlled study examined the effects of low-energy pulsed electromagnetic fields administered via soft collars on patients suffering from persistent neck pain. Results indicated significantly beneficial effects following three weeks of treatment. D. Foley-Nolan, Low Energy High Frequency (27.12 MHz) Therapy for Persistent Neck Pain. Double Blind Placebo Controlled Trial, Bioelectromagnetics Society, 12th Annual, June 10-14, 1990, San Antonio, TX, p. 73.

**Nerve Damage** This controlled study found that exposure to pulsed electromagnetic fields enhanced the speed and degree of peripheral nerve regeneration twofold in rats with experimentally severed sciatic nerves. H. Ito C.A. Bassett, Effect of Weak, Pulsing Electromagnetic Fields on Neural Regeneration in the Rat, Clin Orthop, (181), December 1983, p. 283-290. Results of this controlled study demonstrated that treatment with 15 minutes per day of pulsed electromagnetic fieldsenhanced recovery time of experimentally-injured nerves in rats. A.R. Raji R.E. Bowden, Effects of High-peak Pulsed Electromagnetic Field on the Degeneration and Regeneration of the Common Peroneal Nerve in Rats, Journal of Bone Joint Surg, 65(4), August 1983, p. 478-492. Results of this study indicated that the use of pulsed electromagnetic fields on experimentally divided and sutured nerves in rats sped up regeneration of damaged nerves and the time it took for limb use to be recovered. A.M. Raji, An Experimental Study of the Effects of Pulsed Electromagnetic Field (Diapulse) on Nerve Repair, Journal of Hand Surg, 9(2), June 1984, p. 105-112. This study examined the effects of a Soviet Polyus-1 low-frequency magnet therapy device used to administer approximately 10 mT for approximately 10 minutes in patients with optic nerve atrophy. Patients underwent 10-15 sessions per course. Results showed that vision acuity in patients with low acuity values (below 0.04 diopters) improved in 50 percent of cases. It was also found that the treatment improved ocular blood flow in cases of optic nerve atrophy. Optimal benefits were experienced after 10 therapy sessions. L.V. Zobina, Effectiveness of Magnetotherapy in Optic Nerve Atrophy. A Preliminary Study, Vestn Oftalmol, 106(5), September-October 1990, p. 54-57.

**Neurological Disorders** This article summarizes clinical results obtained the authors in using pulsed electromagnetic fields (Gyuling-Bordacs device) in the treatment of neurological and locomotor disorders among a group of 148 patients in a hospital setting over a period of 3 years. The authors claim that 58-80 percent of such patients experienced benefits of some kind over the course of magnetotherapy. G. Terlaki, Clinical Experiences Magnetotherapy, Hungarian Symposium on Magnetotherapy, 2nd Symposium, 16-17 May 1987, Szekesfehervar, Hungary, p. 175-179. This study examined the effects of magnetotherapy on patients suffering from nervous system diseases. Treatment consisted of 10-12 6-minute exposures (10-20 kG, 0.1-0.6 Hz). Results indicated beneficial effects in 25 of the 27 patients receiving the treatment. A.A. Skorometz, Magnetic Impulse Therapy of Patients with Spondylogenic Diseases of the Nervous System, Fizicheskaia Meditzina, 3(1-2), 1993, p. 41-43. Results of this study found that the use of magnetic fields (30-35 mT, 10 and 100 Hz) produced beneficial effects in 93 percent of patients suffering from nerve problems. A.G. Shiman, Use of Combined Methods of agnetoelectrotherapy in the Treatment for Polineuropathies, Vopr Kurortol Fizioter Lech Fiz Kult, (5), 1993, p. 38-41.


**Osteochondrosis** This study examined the effects of alternating magnetic fields (50 Hz, 10-50 mT) combined with conservative therapy in patients suffering from spinal osteochondrosis. Treatment consisted of 20-minute exposures over a total of 20-25 such exposures per course. Results showed clinical benefits in 95 percent of patients receiving the combination treatment compared to just...
Osteonecrosis

This pilot study found that the use of pulsed electromagnetic fields produced beneficial effects in patients suffering from osteonecrosis of the femoral head. N.S. Eftekhar, Osteonecrosis of the Femoral Head Treated Pulsed Electromagnetic Fields (PEMFs): A Preliminary Report, 1983, p. 306-330. This study examined the use of pulsed electromagnetic fields in the treatment of osteonecrosis. Compared to published findings concerning surgical treatment, results showed PEMF therapy to be superior in producing improvement. M. Hinsenkamp, Preliminary Results in Electromagnetic Field Treatment of Osteonecrosis, Bioelectrochem Bioenerg, 30, 1993, p. 229-236.

Osteoporosis

This study examined the effects of pulsed electromagnetic fields on postmenopausal osteoporosis in 10-month-old female rats. Results showed that EMF treatment for one hour per day for 4 months with a 30-gauss maximum pulse reduced bone mass loss to within 10 percent, while a 70-gauss maximum pulse reduced bone mass loss entirely. M. Hinsenkamp, Preliminary Results in Electromagnetic Field Treatment of Osteoporosis, Bioelectrochem Bioenerg, 30, 1993, p. 229-236. This study examined the effects of long-term pulsing electromagnetic fields in the form of repetitive pulse burst waves over a period of 6 months in osteoporotic rats. Results showed increased bone volume and formation activity. S. Mishima, The Effect of Long-term Pulsing Electromagnetic Field Stimulation on Experimental Osteoporosis of Rats, Sangyo Ika Daigaku Zasshi, 10(1), March 1, 1988, p. 31-45. This study examined the effects of a 72-Hz pulsating electromagnetic field administered for 10 hours per day over a period of 12 weeks on bone density in women prone to osteoporosis. Results found significant increases in bone mineral density in the area of EMF exposure. F. Tabrah, Bone Density Changes in Osteoporosis-prone Women Exposed to Pulsed Electromagnetic Fields (PEMFs), Journal of Bone Miner Res, 5(5), May 1990, p. 437-442. In this study, osteoporosis patients received treatment with pulsed electromagnetic fields (50 G, 50-100 Hz) for 30 minutes per session over a period of two years involving 20 sessions. These subjects were compared to similar patients treated with calcitonin. Results indicated PEMF to be effective in reducing pain, and to be even more so when combined with the conventional drug treatment. T.W. Bilotta, The Use of Low-Frequency Low Magnitude PEMFs in Treatment of Osteoporosis, Journal of Bioelectr, 8(2), 1989, p. 316. This controlled study examined the effects of pulsed electromagnetic fields in women suffering from postmenopausal osteoporosis. Treatment consisted of daily 30-minute exposures for 20 days every six months. Results showed that PEMF treatment combined with 100 IU per day of nasal spray synthetic salmon calcitonin arrested bone decrease and significantly increased bone mass relative to patients receiving drug therapy alone. T.W. Bilotta, Influence of Pulsed Electromagnetic Fields on Post-Menopausal Osteoporosis, First World Congress for Electricity and Magnetism in Biology and Medicine, 14-19 June 1992, Lake Buena Vista, FL, p. 78. Results of this study found the use of total-body low-frequency magnetic fields (60 G, 50-100 Hz) to be effective in the treatment of patients suffering from osteoporosis-related symptoms. Treatment consisted of a total of 15 exposures of 30 minutes each. G. Savierano S. Ricci, Treatment of Senile Osteoporosis Caused Rachialgia with Low-Frequency PEMFs, Journal of Bioelectr, 8(2), 1989, p. 321.

Otitis Externa

This study examined the effects synchronizing pulse waves in the impaired area when treating patients suffering from acute diffuse otitis externa with low-level magnetic fields in combination with conventional therapies. Patients were divided into three groups. The first received ultrahigh-frequency or very-high-frequency electromagnetic waves. The second received 15-minute daily exposures to 50-Hz alternating or pulsating 20-mT magnetic fields. The third group of patients were treated switching on the same magnetic fields only during propagation of the pulse wave through the ear vessels. Results showed a 100 percent recovery rate in patients across all three groups, with recovery taking the least amount of time among those in group 3. V.V. Sunstov, Treatment of Acute Diffuse Otitis Externa Low-Frequency Magnetic Fields, Vestn Otorinolaringol, 6, 1991, p. 35-38.

Pancreatitis

This study found that sinusoidal and low-frequency alternating magnetic field generated a Polius-1 apparatus exhibited beneficial effects in patients suffering from chronic pancreatitis. A.A. Fedorov, The Use of a Low-Frequency Magnetic Field in the Combined Therapy of Chronic Pancreatitis, Vopr Kurortol Fizioter Lech Fiz Kult, (5), September-October 1990, p. 28-30. This controlled study examined the effects of combining pulsed electric stimulation and laser light with conventional treatment in patients suffering from acute pancreatitis. Results showed the combined therapy to have the most significant effects in patients with severe forms of the disease. O.G. Savina, A Low-Frequency Pulsed Current and a Low-Intensity Laser Radiation in the Treatment of Acute Pancreatitis, Vopr Kurortol Fizioter Lech Fiz Kult, (2), 1995, p. 39-40.

Parkinson's Disease

This article reports on the case of a 73-year-old male Parkinson's patients suffering from disabling resting and postural tremors in the right hand, as well as other symptoms. Two successive 20-minute treatments with AC pulsed electromagnetic fields of 7.5-picotesla intensity and 5-Hz frequency sinusoidal wave led to improvements in visuospatial performance and a legible signature. Significant improvements in Parkinsonian motor symptoms were also seen following additional treatments. R. Sandyk, Brief Communication: Electromagnetic Fields Improve Visuospatial Performance and Reverse Agraphia in a Parkinsonian Patient, International Journal of Neurosci, 87(3-4), November 1996, p. 209-217 This article reports on the case of a medicated 61-year-old Parkinson's patient who experienced rapid reversal of symptoms following a single external application of picotesla-range magnetic fields. R. Sandyk R.P. Iacono, Reversal of Visual Neglect in Parkinson's Disease Treatment with pico-Tesla Range Magnetic Fields, International Journal of Neurosci, 87(3-4), November 1996, p. 209-217. This study found that sinusoidal and low-frequency alternating magnetic field generated a Polius-1 apparatus exhibited beneficial effects in patients suffering from chronic pancreatitis. A.A. Fedorov, The Use of a Low-Frequency Magnetic Field in the Combined Therapy of Chronic Pancreatitis, Vopr Kurortol Fizioter Lech Fiz Kult, (5), September-October 1990, p. 28-30. This controlled study examined the effects of combining pulsed electric stimulation and laser light with conventional treatment in patients suffering from acute pancreatitis. Results showed the combined therapy to have the most significant effects in patients with severe forms of the disease. O.G. Savina, A Low-Frequency Pulsed Current and a Low-Intensity Laser Radiation in the Treatment of Acute Pancreatitis, Vopr Kurortol Fizioter Lech Fiz Kult, (2), 1995, p. 39-40.
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al., Transcranial Magnetic Stimulation: A Neuropsychiatric Tool for the 21st Century, Journal of Neuropsychiatry Clin Neurosci, 8(4), Fall 1996, p. 373-382. Results of this study showed that the application of ELF magnetic fields via a plastic helmet device housing a set of coils (generating fields of 8 Hz and 7.5 pT) produced beneficial clinical effects after 30 minutes in patients suffering Parkinson's disease and multiple sclerosis. J. Bardasano, Extracranial Device for Noninvasive Neurological Treatments with Pulsating ELF Magnetic Fields, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy. This article reports on the cases of two Parkinson's patients who experienced improvements in motor symptoms following treatment with external application of weak electromagnetic fields in the pico-tesla range. R. Sandyk, Parkinsonian Micrographia Reversed Treatment with Weak Electromagnetic Fields, International Journal of Neurosci, 81(1-2), March 1995, p. 83-93. This article reports on the cases of three Parkinson's patients on full medication who exhibited an improvement in right hemispheric functions following a series of treatments with external application of electromagnetic fields in the picotesla range. R. Sandyk, Improvement in Short-term Visual Memory Weak Electromagnetic Fields in Parkinson's Disease, International Journal of Neurosci, 81(1-2), March 1995, p. 67-82. This article reports on the case of a medicated 49-year-old male Parkionin's patient who experienced a dramatic improvement in motor, depressive, and cognitive symptoms following treatment with brief extracranial applications of picotesla-range electromagnetic fields. R. Sandyk, A Drug Naive Parkinsonian Patient Successfully Treated with Weak Electromagnetic Fields, International Journal of Neurosci, 79(1-2), November 1994, p. 99-110. This article reports on the case of a 61-year-old Parkinson's patient who experienced improvements in the severity of motor problems 30 minutes after treatment with external application of weak electromagnetic fields in the picotesla range. Sham treatment had no such effects in the same patient. R. Sandyk, R.P. Iacono, Reversal of Micrographia in Parkinson's Disease Application of picoTesla Range Magnetic Fields, International Journal of Neurosci, 77(1-2), July 1994, p. 77-84. This article reports on the cases of five Parkinsonian patients on full medication who experienced a marked improvement in performance on Thurstone's Word-Fluency Test following treatment with a series of extremely-low-intensity electromagnetic fields in the picotesla range and of 5-8 Hz frequency. R. Sandyk, Improvement in Word-fluency Performance in Parkinson's Disease Administration of Electromagnetic Fields, International Journal of Neuroscience, 77(1-2), July 1994, p. 23-46. This article reports on the case of a 69-year-old Parkinsonian patient who was able to discontinue most medication for two weeks following two treatment sessions with extracranial picotesla-range magnetic fields. Symptoms recurred after three weeks and the patient received four more magnetic field sessions on consecutive days after four weeks. The patient was then able to discontinue medications completely. R. Sandyk, Treatment of Parkinson's Disease with Magnetic Fields Reduces the Requirement for Antiparkinsonian Medications, International Journal of Neurosci, 74(1-4), January-February 1994, p. 191-201. This article reports on the cases of five medicated Parkinsonian patients who experienced improvements in motor, behavioral, and autonomic functions, and in visuoconstructional tasks following treatment with extracranial application of magnetic fields in the picotesla range. R. Sandyk, Reversal of a Visuoconstructional Deficit in Parkinson's Disease Application of External Magnetic Fields: A Report of Five Cases, International Journal of Neurosci, 75(3-4), April 1994, p. 213-228. This article reports on the cases of three medicated Parkinsonian patients who experienced relief from disabling periods of freezing gait following treatment with extracranial applications of pulsed electromagnetic fields in the picotesla range. R. Sandyk, Freezing of Gait in Parkinson's Disease is Improved Treatment with Weak Electromagnetic Fields, International Journal of Neurosci, 85(1-2), March 1996, p. 111-124. The cases of four nonmedicated Parkinsonian patients under full medication are discussed in this article. These patients performed poorly on human figure drawing tests administered to measure body image perception. Treatment with extracranial applications of picotesla-range intensity electromagnetic fields led to marked improvements in body image perception as seen on a repeat of the same test each patient. R. Sandyk, Improvement of Body Image Perception in Parkinson's Disease Treatment with Weak Electromagnetic Fields, International Journal of Neurosci, 82(3-4), June 1995, p. 269-283. This article reports on the cases of four medicated Parkinsonian patients who experienced reversal of visuospatial impairments as measured the Clock Drawing Test following treatment with externally applied weak electromagnetic fields of picotesla-range intensity. R. Sandyk, Reversal of Visuospatial Deficit on the Clock Drawing Test in Parkinson's Disease Treatment with Weak Electromagnetic Fields, International Journal of Neurosci, 82(3-4), June 1995, p. 255-268. This article reports on the case of a 68-year-old male patient suffering from Parkinson's disease over a period of 7 years. The patient had experienced little relief from traditional medical therapy. Treatment with external application of picotesla-range magnetic fields led to quick improvements with respect to tremor and foot dystonia, gait, postural reflexes, mood, anxiety, and cognitive and autonomic functions. R. Sandyk, K. Derpapas, The Effects of External picoTesla Range Magnetic Fields on the EEG in Parkinson's Disease, International Journal of Neurosci, 70(1-2), May 1993, p. 85-96. This article reports on the cases of four Parkinsonian patients who exhibited significant improvements in motor symptoms following treatment with externally applied magnetic fields of picotesla-range intensity. R. Sandyk, K. Derpapas, Further Observations on the Efficacy of PicoTesla Range Magnetic Fields in Parkinson's Disease, International Journal of Neurosci, 69(1-4), March-April 1993, p. 67-83 This article reports on two cases of fully medicated Parkinson's patients who experienced enhanced visuoconstructional functions as measured numerous drawing tests following extracranial treatment with picotesla-range magnetic fields. R. Sandyk R.P. Iacono, Rapid Improvement of Visuoconstructional Functions picoTesla Range Magnetic Fields in Patients with Parkinson's Disease, International Journal of Neurosci, 70(3-4), June 1993, p. 233-254. This article reports on the case of a 69-year-old Parkinsonian patient on full medication who experienced a marked improvement on several different drawing tests following 30 minutes of treatment with picotesla-range magnetic fields. R. Sandyk, The Effects of PicoTesla Range Magnetic Fields on Perceptual Organization and Visual Memory in Parkinsonism, International Journal of Neurosci, 73(3-4), December 1993, p. 207-219 This article reports on the case of a Parkinson's patient suffering from severe movement problems who received treatment with external artificial weak magnetic fields with a frequency of 2 Hz and intensity of 7.5 picotesla over a period of 6 minutes. Results showed a significant attenuation in disability and near total reversal of the symptoms lasting approximately 72 hours. The patient then applied equivalent magnetic fields on a daily basis at home. Sustained improvement was seen throughout an observation of one month. R. Sandyk, Magnetic Fields in the Treatment of Parkinson's Disease, International Journal of Neurosci, 63(1-2), March 1992, p. 141-150. This article reports on the case of a 67-year-old male patient suffering from Parkinson's disease and levodopa-related motor fluctuations. Treatment with the application of external weak magnetic fields led to improvements in general Parkinsonian symptoms along with the amelioration of symptoms. R. Sandyk, Weak Magnetic Fields in the Treatment of Parkinson's Disease with the Phenomenon, International Journal of Neurosci, 66(1-2), September 1992, p. 97-106.
**Peripheral Neuritis** In this study, patients suffering from peripheral neuritis were exposed to high-frequency electromagnetic radiation on acupuncture points. EMR was generated Electronica-EnF, Aria, and Porog devices with tunable frequencies ranging between 53 and 78 GHz. Treatments were daily and lasted 25 minutes. Results showed full restoration of nerve function in 87 percent of patients. O. Vassilenko and N.F. Vassilenko, Use of Extremely High Frequency Electromagnetic Radiation for Treating Peripheral Neuritis, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy.

**Pneumonia** Results of this study showed that magnetic laser therapy decreased the severity of acute respiratory insufficiency and treatment course, and prevented destructive complications in children with infiltrative acute destructive pneumonia between the ages of 1 and 12 years. E.A. Gaidashev, An Evaluation of the Effect of Magnetic-laser Therapy on External Respiratory Function in Complicated Forms of Acute Pneumonia in Children, Vopr Kurortol Fizioter Lech Fiz Kult, (3), May-June 1995, p. 2-14.

**Post-Herpetic Neuralgia** This study found both pulsed magnetic field treatment (20-30 minutes per day) and whole body alternating current magnetic field treatment (30 minutes per day) to be effective therapies for post-herpetic neuralgia in older patients. Pulsed magnetic field treatment consisted of 0.6-T (6-KG) samarium/cobalt magnets surrounded spiral coils generating a maximum 0.1-T pulse. Pads were pasted on the sensory areas innervated the dorsal root of the spinal cord where there was scar-association pain or paresthesia. Stimuli were delivered at 280 V and 8 Hz. Alternating current magnetic field treatment involved a treatment bed consisting of 19 electrodes containing paired coils and with a maximum magnetic flux density around the electrodes of 0.08 T. T. Kusaka, Pulse Magnetic Treatment and Whole-Body, Alternating Current Magnetic Treatment for Post-Herpetic Neuralgia, Journal of Japanese Biomagnetism Bioelectromagnetics Society, 8(2), 1995, p. 29-38.

**Pseudoarthrosis** In this study, 92 congenital pseudoarthrosis patients received treatment with pulsing electromagnetic fields. Results indicated a 76-percent rate of lesion recovery. J.S. Kort, et al., Congenital Pseudoarthrosis of the Tibia: Treatment with Pulsing Electromagnetic Fields, Clin Orthop, (165), May 1982, p. 124-137. In this study, 34 patients with congenital pseudoarthrosis-associated infantile nonunions received treatment with pulsing electromagnetic fields. Results indicated that 50 percent experienced full healing, 21 percent experienced healing with need for protections, and 29 percent experienced failure. The majority of failures were among men with a history of early fracture. Following the demonstration of coil effects, the PEMF treatment was combined with surgical realignment, immobilization, and grafting. C.A. Bassett, Congenital Pseudoarthroses of the Tibia: Treatment with Pulsing Electromagnetic Fields, Clin Orthop, (154), January-February 1981, p. 136-148. In this study, 29 congenital pseudoarthrosis patients received extremely-low-frequency pulsing electromagnetic fields. Results: Over 70 percent experienced full healing, 21 percent experienced healing with need for protections, and 29 percent experienced failure. The majority of failures were among men with a history of early fracture. C.A. Bassett, A Non-operative Salvage of Surgically-resistant Pseudoarthroses and Non-unions Pulsing Electromagnetic Fields. A Preliminary Report, Clin Orthop, May 1977, p. 126-143. In this article, the authors report on their own clinical use of electrodynamic field therapy in the treatment of 271 pseudoarthrosis patients over a period of 8 years. They report bony healing in 92 percent of such cases. F. Lechner, Treatment of Infected Pseudoarthroses with Electrodynamic Field Therapy, Fortschr Med, 97(20), May 24, 1979, p. 943-949. This study examined the effects of pulsed electromagnetic fields on 91 patients with congenital pseudoarthrosis of the tibia. Results showed an overall success rate of 72 percent. C.A. Bassett M. Schink-Ascani, Long-term Pulsed Electromagnetic Field (PEMF) Results in Congenital Pseudoarthrosis, Calcif Tissue Int, 49(3), September 1991, p. 216-220. Results of this study indicated that treatment with pulsed electromagnetic fields 271 pseudoarthrosis patients over a period of 8 years. They report bony healing in 92 percent of such cases. F. Lechner, Treatment of Infected Pseudoarthroses with Electrodynamic Field Therapy, Fortschr Med, 97(20), May 24, 1979, p. 943-949. This study examined the effects of pulsed electromagnetic fields on 91 patients with congenital pseudoarthrosis of the tibia. Results showed an overall success rate of 72 percent. C.A. Bassett M. Schink-Ascani, Long-term Pulsed Electromagnetic Field (PEMF) Results in Congenital Pseudoarthrosis, Calcif Tissue Int, 49(3), September 1991, p. 216-220. Results of this study indicated that treatment with pulsed electromagnetic fields had beneficial effects in children suffering from congenital pseudoarthrosis. M.L. Sutcliffe A.A. Goldberg, The Treatment of Congenital Pseudoarthrosis of the Tibia with Pulsing Electrodynamic Fields: A Survey of 52 Cases, Clinical Orthop, (166), 1982, p. 45-57. Results of this study indicated that pulsed electromagnetic fields (72 Hz) can be an effective therapy for patients suffering from lesions associated with congenital pseudoarthroses when treatment is combined with appropriate orthopedic management. J.S. Kort C.A.L. Bassett, Role of Electricity in the Treatment of Congenital Pseudoarthrosis of the Tibia, Reconstr Surg Traumatol, 19, 1985, p. 140-146.

**Psychiatric Disorders** Noting the well-established dangers associated with electroconvulsive therapy, the author, in this theoretical article, argues that transcranial magnetic stimulation should be looked at as an alternative psychiatric treatment. The author asserts that TMS has several advantages over ECT in that it is painless, noninvasive, and more effective on deep structures of the brain. T. Zyss, Deep Magnetic Brain Stimulation - The End of Psychiatric Electroshock Therapy? Medical Hypotheses, 43(2), 1994, p. 69-74.


**Sexual Disorders** Results of this placebo-controlled study showed that magnetotherapy exhibited beneficial effects with respect to cavernous blood flow in male patients suffering from sexual problems. I.I. Gorpinchenko, The Use of Magnetic Devices in Treating Sexual Disorders in Men, Lik Sprava, (3-4), March-April 1995, p. 95-97. This study examined the effects of a combination pulsing magnetic field (PMF)/vacuum therapy in the treatment of impotence. Vacuum therapy consisted of the penis being placed into a hermetic cylinder with a negative pressure of 180-260 mmHg for 10-12 minutes per exposure for a total of 12-15 exposures. PMF therapy consisted of the same length and number of exposures, with 6 Hz, 30 mT being applied to the penile area at the same time as vacuum therapy. Results showed that, following the combination therapy, sexual function was restored in about 71 percent of patients, was improved in 17 percent, and did not change in 17 percent. For those patients receiving vacuum therapy only, the numbers...
were 51, 24, and 24 percent, respectively. I.V. Karpukhin, V.A. Bogomol’nii, Local Vacuum-Magnetotherapy of Impotency Patients, Vopr Kurort Lech Fiz Kult, (2), 1996, p. 38-40. This double-blind, placebo-controlled study examined the effects of weak magnetic fields in men suffering from various sexual disorders, including decreased erection and premature ejaculation. The three different magnetic stimulators used included the Biopotenzor, Eros, Bioskan-1 devices. All patients wore one of the three devices for a 3-week period. Results showed full restoration of sexual function in 38 percent of patients in the Biopotenzor group, 31 percent in the Eros group, 36 percent in the Bioskan-1 group, and in just 15 percent of the controls. Improvements in sexual function were seen among 42 percent, 39 percent, 47 percent, and 18 percent, respectively. I.I. Gorpinchenko, The Use of Magnetic Devices in Treating Sexual Disorders in Men, Lik Sprava, (3-4), 1995, p. 95-97.

**Sleep Disorders** Results of this double-blind, placebo-controlled study indicated that low-energy-emission therapy significantly improved sleeping patterns among patients suffering from chronic psychophysiological insomnia. Therapy was administered 3 times per week, always in late afternoon and for 20 minutes, over a period of 4 weeks. R. Hajdukovic, Effects of Low Energy Emission Therapy (LEET) on Sleep Structure, First World Congress for Electricity and Magnetism in Biology and Medicine, 14-19 June 1992, Lake Buena Vista, FL, p. 92. This double-blind, placebo-controlled study examined the effects of low-energy emission therapy (27 MHz amplitude-modulated electromagnetic fields) in patients suffering from insomnia. Treatment consisted of 3 exposures per week over a 4-week period. Results showed significant increases in total sleep time among patients in the treatment group relative to controls. M. Erman, Low-Energy Emission Therapy (LEET) Treatment for Insomnia, Bioelectromagnetics Society, 13th Annual Meeting, 23-27 June 1991, SLC, UT, p. 69. This review article notes that studies have found low-energy emission therapy to be effective in the treatment of chronic insomnia, and suggests that it may also be of value for patients suffering from generalized anxiety disorders. C. Guilleminault B. Pasche, Clinical Effects of Low Energy Emission Therapy, Bioelectromagnetics Society, 15th Annual Meeting, 13-17 June 1993, L.A., CA, p. 84.

**Spinal Cord Injury** Results of this study found that exposure to constant magnetic fields improved healing in rats with experimentally induced spinal cord injury, and in human patients suffering from spinal cord trauma as well. E.V. Tkach, Characteristics of the Effect of a Constant Electromagnetic Field on Reparative Processes in Spinal Cord Injuries, Zh Nevropatol Psikhiatr, 89(5), 1989, p. 41-44. This study examined the effects of functional magnetic stimulation used to treat spinal cord injury in seven male patients. Results showed the treatment to be an effective noninvasive approach. M.K. Sheriff, Neuromodulation of Detrusor Hyper-reflexia Functional Magnetic Stimulation of the Sacral Roots, British Journal of Urology, 78(1), July 1996, p. 39-46.

**Tuberculosis** This study examined the efficacy of millimeter waves combined with conventional drug treatment in patients suffering from tuberculosis. MW therapy consisted of 10 exposures of the thymus area for 60 minutes per day using a Yavor apparatus (6.4 or 7.1 mm wavelength). Controls received drug treatment only. Results indicated that while MW/drug therapy had no effect on the clearance of the tuberculosis bacteria, it did facilitate clinical recovery faster than drug therapy alone. A. Khomenko, Use of Millimeter-Range Electromagnetic Radiation in Complex Therapy for Pulmonary Tuberculosis, Millimetrovye Volni v Biologii I Medicine, (3), 1994, p. 53-61. This study examined the effects of extremely-high-frequency therapy as administered via a 1 apparatus (7.1 mm wavelength) on tuberculosis patients. Results showed a 25-percent improvement in patients receiving the therapy as a pathogenic treatment. A 72-percent improvement rate was seen among patients who received the therapy as treatment for concurrent diseases. T.V. Kalinina V.D. Churaev, Expense with the Use of the EHF-Therapy at Ryasan’ Regional Clinical TB Dispensary, Millimetrovye Volni v Biologii I Medicine, (4), 1994, p. 52-53. This controlled study examined the effects of constant elastic electromagnetic fields (40 mT) in patients suffering from pulmonary tuberculosis. Therapy consisted of 30-45 minute daily application of either a single magnet or a pair of magnets placed on the chest at an area high in skin temperature over a 1-3 month period. When coupled with conventional treatments, one third of patients receiving the electromagnetic fields experienced healing of tubercular cavities. contrast, only one fifth of patients receiving conventional treatment alone experienced such effects. One month into combination treatment, there was no evidence of mycobacterium tuberculosis in the sputum in half the patients relative to only one third of controls. A.S. Solov’Yena, Use of Constant Magnetic Field for Increasing the Effectiveness of Chemotherapy in Patients with Pulmonary Tuberculosis, Probl Tuberk, 8, 1987, p. 53-56.

**Ulcers (Gastric and Duodenal)** Results of this study showed that the administration of mill metric electromagnetic waves helped to normalize blood properties, subsequently improving the effectiveness of more conventional gastric and duodenal ulcer treatment. M.V. Poslavskii, Treatment of Peptic Ulcer Electromagnetic Irradiation of the Millimetric Range, Sov Med, (1), 1989, p. 29-31. This study examined the effects of millimeter wave (MW) therapy in 317 patients suffering from duodenal and gastric ulcers. MW therapy consisted of 30 minutes per day exposure of the epigastric area apparatus, (10 mW/cm², 5.6-mm wavelength) until complete ulcer cicatrization was achieved. Results showed a 95-percent rate of ulcer cicatrization in patients receiving the treatment compared to a 78-percent rate in controls. One year follow up showed a 54-percent ulcer recurrence rate in MW-treated patients, which was markedly less than the rate for controls. M.V. Poslavsky, Experience with Application of Millimeter-Range Radiation for Treatment and Prophylaxis of Stomach and Duodenal Ulcer, Vopr Kurort Fizioter Lech Fiz Kult, (4), 1989, p. 31-36. This controlled study found extremely-high-frequency therapy to be an effective treatment in patients suffering from duodenal ulcers. Treatment consisted of 5-10 exposures, lasting 20-30 minutes, and making use of the G4-142 apparatus (53.5-70.0 GHz frequency range). M.V. Teppone, Extremely-High Frequency Therapy of Duodenal Ulcer, Klin Med, 9(10), 1991, p. 74-77. This study compared the effects of traditional drug treatment (TDT) to those of microwave resonance therapy (MRT) in patients suffering from duodenal ulcers. Results indicated the mean hospital stay for patients in the TDT group was approximately 22 days. Throughout this period, ulcers healed in 38 percent of patients, were reduced in 17 percent, showed no change in 43 percent, and increased in 2 percent. No pain relief was seen in 32 percent. contrast, mean discharge time for patients in the MRT group was approximately 12 days. Pain was generally stopped in 3-6 days. Complete healing occurred in 81 percent, a decrease was seen in 16 percent, and ulcer size did not change in just 3 percent. Remission occurred in 98 percent of such patients. S.S. Dudka, A Comparative Assessment of the Efficacy of Drug Therapy and Microwave Resonance Therapy for Ulcerative Disease of the Duodenum,* Fundamental and Applied Aspects of the Use of Millimeter
Electromagnetic Radiation in Medicine. Abstracts of the 1st All-Union Symposium with International Participation, May 10-13, 1989, Kiev, Ukraine, p. 195-197. In this study, microwave resonance therapy (MRT) was administered to 2642 patients suffering from duodenal ulcers and to 78 with gastric ulcers. Treatment involved the use of a G4-142 device (53.6-78.3 GHz, less than 2 mW/cm² incident power) as well as Electronika-KVCh and Porog-1 devices. Patients received 6-12 daily exposures of between 20 and 25 minutes. Results showed a total ulcer cicatrization in 80 percent of patients, and arrested pain syndrome in almost 100 percent. V.A. Kutzenok, Microwave ResonanceTherapy of Stomach and Duodenal Ulcers, Fundamental and Applied Aspects of the Use of Millimeter Electromagnetic Radiation in Medicine. Abstracts of the 1st All-Union Symposium with International Participation, May 10-13, 1989, Kiev, Ukraine, p. 192-193.

Ulcers (Trophic) This study examined the use of magnetotherapy coupled with galvanization and intratissue electrophoresis in 86 patients suffering from trophic ulcers. A Potok-1 apparatus with a density of current equal to 0.05-0.1 mA/cm² was used to create an electrical field. The MAG-30 apparatus for low-frequency magnetotherapy with induction of 30 mT and area of exposure of 20 cm² was applied to a trophic ulcer site at the same time. Results led the authors to conclude that magnetogalvanotherapy is the recommended treatment for trophic ulcers of the lower extremities. A.V. Alekseenko, Use of Magnetic Therapy Combined with Galvanization and Tissue Electrophoresis in the Treatment of Trophic Ulcers, Klin Khir. (7-8), 1993, p. 31-34. This review article discusses the theoretical and clinical applications of magnetic field therapy in the treatment of trophic ulcers of the lower limbs. A. Sieron, Use of Magnetic Field in Treatment of Trophic Leg Ulcers, Pol Tyg Lek, 46(37-39), September 1991, p. 717-719. This study looked at the effects of conventional trophic ulcer treatment alone and in combination with alternating magnetic field (AMF) or constant magnetic field (CMF) exposures in a group of patients suffering from various types of trophic ulcers of the lower limbs. Results showed an average hospital stay of 31 days in the CMF group and 27 days in the AMF group, compared to 40 days among controls. Based on these and related findings, the authors suggest combination AMF therapy to be most effective. I.G. Sukhotnik, Comparative Effectiveness of Using Constant and Alternating Magnetic Fields in the Treatment of Trophic Ulcers, Vest Khir, 144(6), 1990, p. 123-124. This placebo-controlled study examined the effects of pulsed electromagnetic fields in the treatment of decubitus ulcers in hospitalized elderly patients with stage II and III pressure ulcers. Patients received daily PEMF stimulation in conjunction with conventional treatment for a period of up to 5 weeks. The findings were that combined PEMF/conventional treatment was superior to conventional treatment and to the placebo received controls. S. Comorosan, The Effect of Diapulse Therapy on the Healing of Decubitus Ulcer, Romanian Journal of Physiol, 30(1-2), 1993, p. 41-45. Results of this study found that the daily use of electromagnetolaser therapy decreased mean healing time in patients suffering from lower extremity trophic ulcers to approximately 18 days, compared with approximately 26 days in patients receiving laser therapy alone. F.V. Galmizianov, Laser and Electromagnetolaser Therapy for Trophic Ulcers of the Lower Extremities in Chronic Venous Insufficiency, Vestn Khir Im I I Grek, 152(5-6), 1994, p. 70-72. This double-blind, placebo-controlled study found that treatment with non thermal pulsed electromagnetic energy (PEMET) accelerated wound healing in spinal cord injury patients suffering from stage II and III pressure ulcers. PEMET treatment consisted of pulse 27.12 MHz energy produced via a Diapulse device. Energy was delivered the use of a treatment head placed in wound dressings, in 30-minute periods twice a day for 12 weeks or until sores healed. C.A. Salzberg, The Effects of Non-Thermal Pulsed Electromagnetic Energy on Wound Healing of Pressure Ulcers in Spinal Cord-Injured Patients: A Randomized, Double-Blind Study, Wounds: A Compendium of Clinical Research and Practice, 7(1), 1995, p. 11-16. This double-blind, placebo-controlled study examined the effects of pulsed electromagnetic fields (75 Hz, 2.7 mT) applied 4 hours per day for a maximum of 3 months coupled with conventional therapies in patients suffering from trophic lesions. Results showed the treatment to have positive effects, but only on small lesions. M. Jeran, PEMF Stimulation of Skin Ulcers of Venous Origin in Humans: Preliminary Report of a Double Blind Study, Journal of Bioelectr, 6(2), 1987, p. 181-188.

Urinary Problems In this article, the authors report on their successful use of magnetic-laser therapy in inflammations of the urinary system in a urological clinic setting. O.B. Loran, Magnetic-laser Therapy in Inflammatory and Posttraumatic Lesions of the Urinary System, Urolog Nefrol (Mosk), (5), September-October 1996, p. 10-14. Results of this study showed magnetolaser therapy to be effective in the treatment of patients suffering from urolithiasis (stone formation). Magneto-laser therapy involved the use of a Milita device with a 35-mT magnetic field. V.P. Avdoshin, Assessment of Magnetolaser Therapy in Comparison with Other Methods of Treatment of Patients with Urolithiasis, Fiz Med, 4(1-2), 1994, p. 102-103.

Wound Healing This study examined the effects of static magnetic fields on postoperative wounds in 21 patients undergoing plastic surgery. Magnetic patches ranging in thickness from 1 to 6 mm, and 2450 to 3950 G field strength were administered over the area of operation for a total of 48 hours. Thirteen patients received the magnets after pain or edema had appeared and 8 received them prophylactically. Results showed a decrease in pain, edema, and coloration in approximately 60 percent of patients. Such symptoms disappeared entirely in 75 percent. D. Man, Effect of Permanent Magnetic Field on Postoperative Pain and Wound Healing in Plastic Surgery, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy. Results of this study indicated that treatment with pulsating electromagnetic field either alone or in combination with laser therapy exhibited healing effects with respect to peripheral nerve lesions and general wound healing relative to controls. B. Vukovic-Jankovic, Peripheral Nerve Regeneration Stimulated Pulsating Electromagnetic Field and Laser, Second World Congress for Electricity and Magnetism in Biology and Medicine, 8-13 June 1997, Bologna, Italy. This double-blind, placebo-controlled study examined the effects of a magnetic treatment device taped over the carpal tunnel against wrist pain sustained at work among a group of turkey plant employees. Results showed that the device was effective in alleviating such pain and that it was free of side effects. M.J. McLean, Treatment of Wrist Pain in the Work Place with a Static Magnetic Device - Interim Report of a Clinical Trial, Second World Congress for Electricity and Magnetism in Biology and Medicine, June 8-13, Bologna, Italy. Results of this controlled study showed that low-frequency pulsed electromagnetic fields produced significant beneficial cutaneous wound healing effects in rats. O. Patino, Pulsed Electromagnetic Fields in Experimental Cutaneous Wound Healing in Rats, Journal of Burn Care Rehabil, 17(6 PT 1), 1996, p. 528-531. This double-blind, placebo-controlled study found that treatment with non thermal pulsed radio frequency energy accelerated wound healing in spinal cord injury patients suffering from stage II and III pressure ulcers. RF treatment consisted of pulsed 27.12 MHz energy produced via a...
Diapulse device, with energy delivered via a treatment head placed in wound dressings, in 30-minute periods twice a day for 12 weeks or until sores healed. C.A. Salzberg, The Effects of Non-Thermal Pulsed Electromagnetic Energy on Wound Healing of Pressure Ulcers in Spinal Cord-Injured Patients: A Randomized, Double-Blind Study, Ostomy Wound Manage, 41(3), 1995, p. 42-51. After a discussion of the mechanics involved in the use of pulsed electromagnetic energy in the treatment of disease, the author discusses findings from recent studies pointing to the therapy's effectiveness with respect to the treatment of acute soft-tissue lesions. G.C. Coats, Pulsed Electromagnetic (Short-Wave) Energy Therapy, British Journal of Sports Medicine, 23(4), 1989, p. 213-216. Results of this placebo-controlled study indicated that low-intensity continuous microwave radiation administered over a period of 7 days was effective in treating post-operative purulent wounds associated with abdominal surgery. N.N. Korpan T. Saradeth, Clinical Effects of Continuous Microwave for Postoperative Septic Wound Treatment: A Double-Blind Controlled Trial, American Journal of Surgery, 170(3), 1995, p. 271-276. Results of this study showed that combined magneto/laser therapy reduced inflammation and wound suppuration, and enhanced tissue healing significantly in patients suffering from gunshot wounds relative to conventional treatment only. N. Bairamov, Magnetolaser Therapy in Complex Treatment of Gunshot Wounds, All-Union Symposium: Laser and Magnetic Therapy in Experimental and Clinical Studies, 16-18 June 1993, Osnik, Kaluga Region, Russia, p. 184-185. Noting that pulsed electromagnetic fields have been used in bone healing for more than 20 years, this review article cites recent results from both animal and human studies pointing to the efficacy of PEMF in the treatment of soft-tissue injuries as well. B.F. Siskin J. Walker, Therapeutic Aspects of Electromagnetic Fields for Soft-Tissue Healing, in M. Blank, (ed.), Electromagnetic Fields: Biological Interactions and Mechanisms, Washington, D.C.: American Chemical Society, 1995, p. 277-285. This double-blind study examined the effects of postoperative nonthermal pulsed high-frequency electromagnetic fields on edema formation and bruise healing in boys undergoing orchidopexy. Treatment involved exposure 3 times daily for the first 4 days following surgery. Significant effects with respect to rate of bruise resolution were reported in patients receiving the treatment relative to controls. R.H.C. Bentall H.B. Eckstein, A Trial Involving the Use of Pulsed Electro-Magnetic Therapy on Children Undergoing Orchidopexy, Z. Kinderchir, 17(4), 1975, p. 380-389. This controlled study examined the effects of pulsed electromagnetic fields in patients suffering from chronic productive inflammation or orbital tissue. PEMF treatment consisted of 7-10 minute daily exposures over a period of 10 days. Controls received conventional treatment only. Both groups showed good improvement, but patients treated with the PEMFs recovered significantly faster than did controls. L.S. Teren'eva, Treatment of Chronic Productive Inflammation of Orbital Tissues with a Pulsed Electromagnetic Field, Oftalmol Zh, 1, 1996, p. 1-5.